What is claimed is :

1. A method for manufacturing a combined solid immersion lens (SIL) and submicron aperture, comprising the following steps:

(i) providing a substrate;

(ii) depositing a sacrificial layer on the substrate;

(iii) coating a first photoresist layer on the sacrificial layer, and using photo – lithography to pattern said first photoresist layer to define an initial aperture;

(iv) performing reflow process on said first photoresist layer to make edge of the aperture round and smooth and form a cone-shaped aperture;

(v) performing over- etching process to remove the sacrificial layer below the aperture;

(vi) depositing a conductive material on the reflowed first photoresist layer as a current conducting layer;

(vii) performing electroplating to reduce the aperture size;

(viii) coating a second photoresist layer on the electroplating layer, and using photo – lithography to pattern said second photoresist to define a cylindrical phtoresist structure,

(ix) applying a high temperature thermal reflow to allow the cylindrical photoresist structure to form a hemi-sphere shaped lens; and

(x) removing the substrate.

2. The method according to Claim 1, further comprising steps of using a

spin-coating process to coat a third photoresist layer on the substrate after forming the hemi-sphere shaped lens, and using photolithography to make an optical fiber support on the substrate.

3. The method according to Claim 1 wherein said first photoresist layer and second photoresist layer may use the same or different material, and said third photoresist layer should not use the same material as said second photoresist layer.

4. A device for a combined solid immersion lens (SIL) and submicron aperture, arranged between an optical read/write head and a recording media, comprising a solid immersion lens (SIL) and a submicron aperture, wherein said aperture is made of a first photoresist layer by using photo-lithography and said first photoresist layer is coated on a sacrificial layer which is deposited on a silicon substrate, and said SIL is made of a second photoresist layer above said aperture by using photolithography.

5. The device according to Claim 4, wherein said aperture is made by using reflow process on said first photoresist layer to allow edge of said aperture round and smooth and form a cone-shaped aperture to increase an amount of light incident into said aprerture.

6. The device according to Claim 4, wherein said SIL is made by using photo-lithography on said second photoresist layer to form a cylindrical shaped photoresist structure and then using high temperature reflow process on the cylindrical shaped photoresist structure to form a hemi-sphere shaped lens.

7. The device according to Claim 4, further comprising an optical fiber support, made by using a spin-coating process to coat a third photoresist layer on the substrate, and using photo-lithography on said third photoresist layer.

8. The device according to Claim 4 wherein said first photoresist layer and said second photoresist layer may use the same

or different material, and said third photoresist layer should not use the same material as said second photoresist layer.